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Astero'ecanium pustulans (Ckll.).

- g. 5. Last abdominal segment. Fig. 10. Last abdominal segment of the
 " 6. Marginal pits of the same. same.
 " 7. Ventral aspect of first stage. " 11. Pupa ♂.
 " 8. Antenna of the same.

Lecanium hemisphæricum Targ.

- Fig. 12. Antenna of the female. Fig. 15. Marginal spines of the same.
 " 13. Posterior margin of the female. " 16. Leg of the same; *a*, claw.
 " 14. Pits of the same

PLATE V.

Lecanium hesperidum L. var. *pacificum*, var. nov.

- Fig. 17. Ventral aspect of female. Fig. 20. Spines of the anterior incision.
 " 18. Antenna of the same. " 21. Anal plate of the same.
 " 19. Marginal spines of the same. " 22. Leg of the same; *a*, claw.

Aspidiotus lataniae Sign.

- Fig. 23. Female; *a*, antenna of same. Fig. 24. Ventral aspect of the last abdominal segment of the female.

Aspidiotus smilacis Comst.

- Fig. 25. Female. Fig. 26. *a*, *b*, ventral aspect of the last abdominal segment of the female.

NEW SPECIES OF NOCTUIDÆ FOR 1902.

BY JOHN B. SMITH, SC.D.

This is the first of a series of descriptive papers based upon material that has accumulated in my collection or has been sent in by correspondents. As the drawers are rearranged from time to time the doubtful specimens are separated out until such period as further accessions definitely determine their status. Then descriptions are made as time allows and of those that are presented here, some were written five or six months ago.

It has not been until within very recent times that entomologists have appreciated fully the importance of accurate data concerning localities and dates of captures, and of good series of "common" species from all sections. Perhaps nowhere more clearly than in the Noctuids can formative species be studied when sufficient material is at hand. Species that have been in the past accepted as identical with European forms have shown, on closer study, divergencies that

have authorized new specific names: varieties from other faunal regions within our own borders have shown constant characters that have made their real status a matter of serious question, and the collector who, now-a-days, fails to secure a good series of all the "common" species within his reach fails to grasp the opportunity to contribute towards an answer to the question, "What is a species?"

My greatest difficulty has been, of late, to get such "common species," for nobody has them in duplicate: and yet, in such types as *Agrotis (Noctua) rubifera*, *perconflua* and allies we find the influence of locality most strongly marked and the range of variation in maculation, as compared with sexual divergence most markedly illustrated.

In other words, one male and one female from any given locality may, but do not necessarily, illustrate a species. One hundred specimens of each sex may illustrate the species as it occurs in one locality, but they do not necessarily illustrate the range of the species. We have always admitted that genera were matters of individual opinion. I am not ready to say as much for species; but I do claim that we cannot say positively what is a species and what is a local variety until we have an abundance of material from each of the localities concerned. Furthermore, my studies seem to lead to the conclusion that there are very few species, comparatively, that occur unmodified in two or more real faunal regions. We may have closely allied, or representative species and we do undoubtedly have some widely distributed forms that hold their characteristics under the most divergent conditions; but as a rule specimens from well-defined faunal regions must be very closely compared before they can be said to be certainly the same.

***Euthyatira pennsylvanica*, var. nov.**

In the course of a paper on the geographical distribution of North American Lepidoptera, Mr. Grote referred (Can. Ent., XVIII, p. 215) to a form of *Thyatira pudens* found in Anticosti. In a footnote he adds: "This variety is worthy of a distinct name, and in my second Check List of N. Am. Noct. (MSS.) I have called it *anticostiensis*. The moth is grayer, more hoary, the pink color has faded. Mr. Wm. Couper has taken this form on the island." In the text he refers to the matter in this wise: "From what I have seen I think that *Thyatira pudens*, found on Anticosti, has become grayer, the pink spots less vivid than on the mainland; the darkening by mixture of color, noticeable in polar species, has here taken place."

This is clear and there can be no sort of doubt of the character of the variation which Mr. Grote intended to name. I have seen just this sort of change in other species, but not in *pudens*. During the year or two last past, Mr. H. D. Merrick, of New Brighton, Pennsylvania, has taken a considerable number of specimens, to which, in some way, the name *anticostiensis* came to be applied. It differs from the type form in lacking the pink shades entirely, and in having the normal maculation more complete and more clearly written. The ground color is also richer and more intense than in the type form, so that, when I had only a single specimen I strongly suspected a new species. Mr. Merrick has taken so many examples however, in company with the normal form and under conditions which convinced him that copulation between the two had taken place, that the relation between the two remains hardly doubtful. It is certainly a strongly marked departure from the type and therefore entitled to a varietal name which I derive from the locality. It is of course probable that the same form occurs elsewhere, but its local abundance at this point deserves recognition.

Dates of capture range from April 29th to May 5th, and the species is thus an early flier.

Cyathissa pallida, sp. nov.

Ground color white with a faint creamy tinge. Head and thorax concolorous, the posterior thoracic tuft tipped with pale rusty brown. A short rusty basal streak, emphasized by a few black scales; but not prominent. Basal line marked by a few rusty costal scales only. T. a. line geminate, incomplete, rusty luteous, a little angulated below the cell, then almost evenly oblique to the inner margin: in the submedian interspace the inner line is emphasized by black scales. S. t. line not defined. The ordinary spots are not defined. The upper half of the median space is pale slate gray, and out of this shade is cut a large oblong white spot, extending from costa into the median cell and well defined by darker scales. A slaty gray shading also extends through the s. t. space, narrowly bordering the t. p. line to the angle, where the shade expands and extends to the anal angle, leaving free a semicircular area on the inner margin beyond the t. p. line: this area is faintly yellow-tinged. There is also a vague slaty shading within the excised outer margin below apex. Secondaries white, immaculate. Beneath white, with a vague creamy tinge along the costal area. Expands 1 inch = 25 mm.

Habitat.—Walters Station, California, in April (George S. Hutson).

Has the peculiar pallid desert appearance and is represented by one good female. It seems to be fully congeneric with the Texan *percara* and the type of maculation is identical; but this is a larger

species and the color is totally different. There is no trace of green anywhere and, as the specimen was perfectly fresh when received and had not been exposed to light, I do not think there ever was any. It is an interesting occurrence and adds a mate to a species that has been long solitary in our lists.

Noctua sprete, sp. nov.

Size and form of *lubricans*, for which it is readily mistaken. The obvious difference is in the absence of all black markings on the collar. Ground color a fawn gray, with a variable admixture of reddish, changing the dominant tint. Basal line single, marked by a black bar across the costal region, then broken and obscure or altogether lost. T. a. line also single, variably indicated, sometimes lost, usually traceable below the median vein, never complete. T. p. line single, usually marked on the costa only, sometimes traceable for its full course as a smoky, evenly outcurved line which is a very little lunulated between the veins. The outer portion of the wing is usually a little darker, and in this the s. t. line may or may not be marked by whitish dots. So there may be also a blackish shading on the costa preceding this line. An obscure, lunulated, terminal line is indicated. None of the markings above described are prominent or contrasting, and all is obscure, powdery.

In some examples a reddish median line is traceable. Orbicular wanting. Reniform marked by black scales or small irregular spots; not outlined. Secondaries smoky in both sexes, darker in the female, a little paler basally. Head a little paler gray in front; sides of palpi blackish. Expands 1.30–1.50 inches = 33–37 mm.

Habitat.—Hastings, Florida.

Four males and six females from Mr. George Franck, in fair condition. The line of variation has been indicated, and the specimens before me range from almost immaculate to one in which all the described maculation is easily visible.

Feltia subgothica Haw.

The rearrangement of my Agrotid series brought to light certain examples from British Columbia, Vancouver and Washington, that did not appear to be specifically identical with the eastern form. The specimens ran larger, the markings seemed better defined and the reniform tended to become upright, not kidney-shaped or even oval. With this was also a more or less marked discoloration, the spot in some examples being of a uniform, discolourous, pale yellow. I suspected the latter of being *evanidalis* Grt., but the antennæ are not more obviously pectinated than in the eastern form.

Finally I wrote to my correspondents for specimens, and bought a lot from Mr. George Franck, so that I now have before me a series of over 100 selected examples ranging in locality from the Atlantic to the

Pacific, from Calgary, Alberta, to Hot Springs, New Mexico, and "Texas." I have none from any part of California, but have examples from Corvallis, Oregon; Seattle and Pullman, Washington; and several points on Vancouver Island.

I have arranged these again and again in different ways, using first one character and then another as basis, and have failed at last to convince myself that there is more than one species, though the extremes differ markedly. Nowhere, however, is there any tendency toward either *tricolor* or *herilis* and the validity of the species as distinct from them is abundantly confirmed. Neither antennal nor genitalic structure give us any assistance. There is a little difference, apparently, in the length or thickness of the former as a whole, and of the lateral processes of the joints, but not more than is within specific range. In fact, two specimens most nearly alike and from identical localities sometimes showed greater differences than the most unlike examples from opposite sides of the continent. The genitalic structure of the male is absolutely identical.

Taken as a whole examples from the Pacific Coast and from Calgary are larger and seem more robust, especially in the male. In my eastern series the males as a whole are smaller and slighter than the females. In the Oregon, Vancouver and Washington series the males were uniformly larger than the females. There are of course small males and large females, but the average is as I stated.

In the color of the secondaries the range is from almost uniform white to an even smoky black, in both sexes; though the females rarely have clean secondaries. All intermediate forms are found, from the narrow dusky margin to the complete domination of the darker color. The costa, subterminal and internal regions may be bright yellowish gray and contrasting, or they may be even, smoky, without any relief.

The orbicular varies little: it may be darker or lighter than the costa and may be rounded or angulated at the bottom. The reniform varies more, in color and in form. As to form it is normally kidney-shaped, of moderate size and well proportioned. Sometimes it broadens and the outer margin becomes straight. Then it may narrow and the curves become intensified; or it may become upright, losing all curve, or becoming a long oval. Normally the spot is annulate with yellowish, the center reddish or brown, with a narrow, yellow, central line. This may become uniform, the central line being lost;

or it may become much more distinctly emphasized giving rise to greater contrast, or the entire center may be discolored, either reddish or bright yellow.

Altogether there is much more variation than in many other species that look less alike, and there is good evidence of a beginning racial separation. The simplicity and uniformity of the sexual structures tend to prevent fixity in such variations as do occur, and allow only such differences as the relative size of the sexes to become at all permanent.

***Feltia edentata*, sp. nov.**

Has the general appearance and size of *tricosa* Lintner. Head smoky above, reddish-gray inferiorly. Palpi smoky at the sides. Collar smoky brown from base to a black line above the middle then with a whitish, brown and whitish line to the tip. Patagiae gray, and brown mottled; disc of thorax brown, posterior tuft grayish. Primaries smoky brown, relieved by reddish-gray shadings as follows: over the subcostal vein to the cell, not involving the costa which remains smoky; over the median vein; over the claviform and below it to the s. t. line; and in the s. t. space. The veins are dark marked through this lighter shading. Basal and transverse anterior lines reddish-gray, slender, marked only through the submedian interspace. Transverse posterior line marked only by the contrast between the dark median space beyond the cell and the lighter subterminal space. Subterminal line marked by the contrast between the evenly dark narrow terminal space, and the paler subterminal space; not extending to the pale apex. A series of small black terminal lunules, beyond which is a yellowish line at the base of the fringes. Claviform long, extending almost across the median space, black margined, smoky filled, the smoky shade extending to the base and filling the submedian interspace. Cell before, around and beyond the ordinary spots, smoky. Orbicular V-shaped, open above, invaded by the reddish-gray shade on the subcostal, margined by a paler line. Reniform narrow, oblong, upright, a little wider above, outlined by a reddish-gray annulus, filled with rusty brown. Secondaries soiled yellowish white at base, darkening to a smoky outer border. A yellow line at base of fringes which are pale, with a smoky interline. Beneath, primaries smoky, becoming yellowish along inner margin; secondaries whitish, powdered along the costal region with a large apical cloud which is usual in this series. Expands 37 mm. = 1.50 inches.

Habitat.—Pullman, Washington, August 13.

A single male, found mixed with a lot of unspread specimens of *subgothica*. From that species it is at once separable by the lack of the dents or rays extending through the terminal space. It is thus in reality a nearer ally of *tricosa* Lintner. It differs by the dark costa, by the shape of the reniform and by the course of the transverse posterior and subterminal lines so far as these are traceable. The antennae are quite strongly brush-like, the lateral processes from the joints quite

long, the bristle tufting well-marked. In the actual arrangement of these tufts it is nearer to *subgothica* than to *tricosa*. It is probable that other examples occur, confused under another specific name.

***Luperina trigona*, sp. nov.**

Ground color a dull, pale luteous, variably irrorate with deep smoky brown. Head and thorax concolorous with either the light or the darker parts of the wings. Primaries with costa, terminal space, and a broad band along the internal margin luteous, leaving a contrasting dark brown triangle which touches the outer margin only at the costa in the s. t. space. The median lines are lost. S. t. line marked by the contrasting colors, and by a series of darker, more velvety brown spots. A series of very small, powdery, blackish, interspacial terminal lunules. Median vein to the end of cell a little luteous. Orbicular small, variable in shape, luteous. Reniform moderate, upright, a little constricted, incompletely outlined, luteous, partly brown filled inferiorly. Secondaries pale luteous, the disk a little smoky in the female. Beneath pale luteous, disk a little smoky, all wings with a narrow darker lunule. Expands 1.60-1.80 inches = 40-45 mm.

Habitat.—Smith County, Tenn., August 6, 7, 21.

Two males and two females in fair condition only, of this remarkable species are before me, through the kindness of Mr. Stanley T. Kemp, of Elizabeth. It is allied most nearly to *passer*, but is a much more robust species. There is absolutely no danger of mistaking this species and that it should so long have evaded discovery I cannot understand. I know nothing of the country where it was taken or of the circumstances of its capture.

***Hadena miseloides* Gn.**

In looking over a long series of specimens of this species to determine the range of variation to be represented in the collection, I noticed that certain Texan examples did not seem to fit anywhere satisfactorily, so, by the courtesy of Dr. Dyar, I secured such as were represented in the U. S. National Museum from that State; in all six specimens. All are females, unfortunately, and while their association with the normal form of the species is obviously indicated, they offer certain characteristic features that indicate a well-marked geographical race, at least.

Compared with a series of 15 female examples within the normal range of variation, the Texans ranged an average of 32 mm. in expanse against 34 mm. in the others. None of them had the brilliant mossy green powderings of the typical form. Two specimens had an obviously green shading, but much reduced in extent and not at all

prominent. Two have no trace of green whatever and on two others it is reduced to mere indications. The ordinary markings, perhaps as the result of the more even color, seem to be more even and better defined; this is especially true of the median shade line. The s. t. line is more even, better defined, and in all cases there is an obvious terminal space not invaded to the margin by extensions from the s. t. space. A blackish bar extends from anal angle through submedian interspace almost or quite to the t. p. line. This is more or less indicated in some examples of the type form in a diffused shading which does not extend within the s. t. line. Finally there is a distinct bar from the end of the claviform to the t. p. line which is also diffusedly indicated in the type.

I do not think we have to do with a good species here; but it is a well-marked geographical race which deserves a name that it may receive further attention from collectors. As such I propose the term *Hadena miscellus*. Two examples only have definite localities; Waco, Texas, September 1; Blanco County, Texas, no date; two others are from Belfrage, May 4 and April 20. The others are marked Texas only, without other indication.

A good series, including males would be very desirable.

Hadena macerata, sp. nov.

Resembles *miseloides* in wing form, type of maculation and general coloration. Head mottled with green, yellow and blackish scales. Collar deep brown at base, mossy yellowish green above, a blackish line through the center of this shade. Thoracic disc mottled with greenish-yellowish, white and black, posterior tuft yellow tipped. Abdomen smoky gray, tufts prominent and more ashen gray. Primaries irregularly mottled with mossy yellow and greenish scales, the former predominating; all the ordinary markings broken and obscured except for the very large, white reniform. The basal line extends across the wing, is geminate, broken, best marked on the submedian vein where a black tooth is sent in to the base from the inner part of the line. T. a. line so badly broken as to be obscure, but as a whole it is a little out-curved. T. p. line geminate, outer line broken, obscure, gray; inner line black, less broken; somewhat squarely exserted over the cell thence rather evenly oblique to the inner margin. The space between the median lines is the darkest part of the wing, becoming blackish below the cell and between the ordinary spots, while costal region and internal margins are mottled. On the costal region a black median shade is clearly marked, extending obliquely between the ordinary spots, angled below the reniform, thence direct to inner margin where it again becomes obvious. Claviform small, pointed, black, a black shade extending from it through submedian interspace, to t. p. line. Orbicular oval, oblique, annulate with white, mossy filled, variable in size. Reniform large, subquadrate, the angles rounded, contrasting white. S. t. space with grayish rays extending from t. p. line toward outer margin; in part met by

similar rays from outer margin, breaking up the space into more or less complete oval blotches. No complete s. t. line, and only indications are found of what normally occurs. Fringes brown, cut with whitish on the veins. Secondaries smoky, tending to become paler toward base. Beneath powdery; primaries smoky on the disc, terminal space paler, a broad blackish cloud at middle of costa and a broad, powdery, obscure extra-median band. Secondaries paler with broad inner and extra-median powdery blackish bands and a discal spot. Expanse, 32 mm. = 1.28 inches.

Habitat.—Cartwright, Manitoba, July 11; Winnipeg, Manitoba, July 7.

Two females from Mr. Heath and Mr. Hanham, respectively. They resemble a very much mottled *miseloides* and so I took them to be when first received. Comparing with a large series of the old species, however, showed that this was a specific character, emphasized by the absence of the s. t. line and other minor features. It is probable that the white contrasting reniform may be absent in some examples as it is not infrequently in *miseloides*. It is another of those cases of a representative species of which we have had so many of late years from this same locality.

***Hadena uncinata*, sp. nov.**

Ground color bluish ash gray, with blackish powderings, the veins of primaries all blackish. Head and thorax concolorous, patagiæ a little smoky at the base of the wings. A distinct, slender black streak extends from the base through the submedian interspace to the transverse anterior line. T. a. line marked only by a geminate lunule between internal vein and inner margin. Transverse posterior line single, black, obscure over the cell where it is squarely exerted, well marked below vein 2 to the inner margin, rigid, followed by a white shade. This is the most prominent bit of wing ornamentation and gives the name to the species. S. t. line practically obsolete. A broken blackish, terminal line. Claviform large, broad, concolorous, outlined by a distinct narrow black line which is not entirely complete. Orbicular large, oval, oblique, almost or quite touching the reniform inferiorly, narrowly black ringed, whitish filled. Reniform moderate in size, kidney-shaped, outwardly not defined, inwardly well margined by a black line, whitish filled, but merging outwardly into the ground. Secondaries even, smoky pale gray, with a tendency to white at the base. Beneath, pale gray, powdery. Expands 37 mm. = 1.50 inches.

Habitat.—Soda Springs, August 27, California; Sierra Nevada, California, two female examples.

The specimen from Sierra Nevada is type No. 4949 of the U. S. National Museum, and both came through Mr. Henry Edwards, years ago and at quite different times. It is a well and simply marked form which is not easily mistaken. In its wing form it is allied to *diversicolor* Morr., the type of maculation being also similar, or yet more nearly like *claudens*. In the absence of a male it is not possible to

say with certainty that the insect does not belong with *Xylophasia*, but I deem it unlikely.

Mamestra circumvadis, sp. nov.

Ground color white, mottled or overlaid by grayish-yellow or olivaceous shades and tints. Front of head and sides of palpi brownish; vertex white, a black line between the bases of the antennæ. Collar white, with a luteous band near tip and some black scales laterally. Thorax white, speckled with olivaceous: dusky line behind the collar, a similar line on the disc of the patagiæ and at the base of the wings. Abdomen smoky. Tarsi obscurely white ringed. Primaries somewhat blotchy in appearance, but with all the normal maculation present and well defined. Basal line geminate, the inner portion black, outer brown, lunulate in the interspaces: continued below the median vein by a subquadrate black spot above and a curved black mark below the internal vein. The basal space is mostly whitish, but becomes olivaceous toward the t. a. line. T. a. line geminate, nearly upright, a little out-curved in the interspaces, the outer portion black in the cell and in the submedian interspace; obscure below the internal vein, where the margin is whitish almost to the anal angle. T. p. line geminate, squarely exserted over the cell, inwardly oblique and a little incurved below: inner line black, lunulate, the points well marked on the veins. The median shade line is marked on the costa between the ordinary spots, below which it runs close to the t. p. line; visible only in the pale areas of the median space which are just below the cell and along the inner margin. S. t. line white, a little irregular, edges not sharply defined, preceded by prominent, sagittate black spots in the third, fourth and fifth interspaces. Lower part of the s. t. space whitish. Terminal space evenly olivaceous gray. A series of small black, interspatial, terminal lunules, beyond which the pale interlined fringes are cut with brown. Claviform short, broad, incompletely outlined by black scales. Orbicular large, nearly round, white, with a diffuse luteous gray center. Reniform large, wide, broadly white ringed, the center somewhat paler than the rest of the dark wing shading. Secondaries smoky, blackish, paler at base, with an extra-median dark line, a vague discal lunule and white interlined fringes. Beneath with an almost uniform smoky suffusion over a white base: an outer transverse line and a discal lunule being more obvious on the secondaries. Expands 1.36 inches = 34 mm.

Habitat.—Head of Pine Creek, Calgary, Alberta, July 21, 1900, Mr. Dod (No. 31).

This striking species was first sent me by Mr. Dod in December, 1900, and was returned to him as probably new. It was again sent me in 1901, still unique, and is now described from the female only—a fine, almost perfect example.

This species is robust, with quadrate heavy thorax, short triangular wings, and is allied to *chartaria* and *defessa*.

Mames'ra vau-orbicularis, sp. nov.

Ground color an obscure, gray, luteous brown, with smoky and blackish shades and powderings. Head with the vertex a little darker. Collar with a broad, dusky,

median transverse band. Thorax with patagiæ scantily powdered with blackish scales. Abdomen uniform, only a little paler than general ground. Primaries with all the ordinary maculation present but, except for the ordinary spots, not contrasting or prominently defined. Basal line geminate, blackish, with a sharp outward angle on the subcostal. On the internal vein, just beyond the termination of the basal line, is a black spot which extends obliquely upward toward the costal inception of the t. a. line; but is diffuse and becomes lost in the cell. T. a. line geminate, almost evenly oblique outwardly. The component lines are slender, the outer blackish and marked by a larger spot on costa, scarcely complete; the inner is hardly defined except on costa, and by the somewhat yellowish included space. T. p. line geminate, only a little outcurved over the reniform and then almost evenly oblique to the inner margin. The inner line is blackish, slender, crenulate; the outer is composed of black, followed by yellowish venular dots. The included space is yellowish. Median shade broad, diffuse, smoky, outwardly oblique from costa between the ordinary spots, involving the reniform inferiorly; thence inward, parallel with and close to the t. p. line, to the inner margin. S. t. line yellowish, very even except for a jog on vein 7, emphasized by preceding, diffuse blackish spots. A series of small, black, terminal lunules. Fringes yellowish, with a smoky interline. Claviform wanting. Orbicular small, concolorous, open above, outlined by a black V, which forms the most prominent feature in the maculation. Reniform upright, long, narrow, somewhat crescent-shaped, incomplete above and below, the sides with a black margin, within which is a narrow yellow line. Secondaries dull smoky fuscous, a little paler and more transparent at base. Beneath, smoky with a yellowish tinge, powdery, with a common outer line which is incomplete on the primaries, and a discal spot which is well marked only on the secondaries. Expands 1.40 inches = 35 mm.

Habitat.—Corvallis, Oregon, June 21, 1900, Professor Washburn.

A single male in good condition. The antennæ are feebly ciliated only. The legs are densely clothed with long, divergent scales; but there appear to be no true tuftings. The species belongs with *noverca* and *goodelli* in type of maculation; but it is larger and more robust than either. The thorax is quadrate, the vestiture rather loose, the divided crest and the patagiæ are both well marked. At first sight the species recalls an *Hadena* of the *binotata* series, but the eyes are obviously hairy. The characteristic V-mark will serve to identify the species readily.

***Oncocnemis balteata*, sp. nov.**

Head gray; white with black scales intermixed: a blackish line across the front, another between the antennæ. Thorax rusty luteous, with white scales intermixed: collar with alternating black and white lines, tipped with luteous. Primaries rusty luteous at extreme base, darkening rapidly to a smoky brown which extends to the middle of the wing. This is followed by a broad whitish band, which outwardly merges through luteous into a dark, smoky, terminal space. The ordinary maculation is more or less clearly marked in all these spaces. Basal line geminate, marked across the costal region only. T. a. line geminate, dark smoky, a little oblique and with

small outward bends in the interspaces. T. p. line geminate on costa only, thence narrow, single, broken, luteous, squarely exerted over the cell and deeply incurved beneath. This line runs entirely through the white area and is not at all well-marked. S. t. line very close to the outer margin, broken, very irregular, marked partly by white scale lunules, partly by preceding or following irregular black spots. A broken, black terminal line. Fringes brown at base; outer half alternately cut with brown and white. Claviform a very small black loop, filled with white scales. Orbicular small, round, black ringed, with a white inner annulus and a small brown central dot. Reniform rather large, kidney-shaped, very imperfectly outlined by luteous scales, the whole macula being included in the white band. Secondaries white, a little luteous at base, with a broad black marginal band and white fringes. Beneath white with a broad black marginal band. Primaries smoky in the costal region and toward base: fringes interlined and cut with black and white. Secondaries black-powdery on costa toward base, with a small black discal dot and with white fringes. Expands 1 inch = 25 mm.

Habitat.—Poncha Springs, Colorado, August 14th, Oslar.

One male in good condition. It belongs to the *levis* series, in which the fringes are long and the outer black band of the secondaries is defined. When spread there appears a continuous white band across both wings somewhat as in *fasciata*; but this is a smaller species and quite distinct.

***Oncocnemis regina*, sp. nov.**

Head, thorax and primaries very pale ashen gray with a yellowish tinge. Head and base of collar with a somewhat reddish shade, the thoracic parts speckled with black scales. Primaries with all the maculation present, but with a washed-out, faded, powdery appearance. Basal line feebly traceable, single. T. a. line single, narrow, brown, even, with an even outcurve. T. p. line blackish, single, irregularly dentate, broadly outcurved over the cell and a little incurved below; followed by a creamy yellow shade which is the palest portion of the primary. Through the center of the wing is a broad, vague, diffuse brown band. The s. t. line consists of yellowish preceded by blackish scales, which emphasize the line and then fade into the s. t. space, which, as a whole, is darker than the terminal space. The latter is a very finely powdered creamy gray. Fringes yellowish, with brown lunules opposite the veins. Claviform wanting. Orbicular round, moderate in size, with a broad yellowish annulus; the center of the ground color. Reniform moderate in size, broadly kidney-shaped, yellow, with a central darker shading. Secondaries washed-out yellow, with a broad black border, the fringes yellow. Beneath, both wings yellow, with broad black borders and yellow fringes. Expands 1.12 inches = 28 mm.

Habitat.—Regina, N. W. T., 1886, Dr. James Fletcher.

A single male, in poor condition, but with the wings of one side nearly perfect. I have had it in my collection for years, awaiting a mate; but up to the present time none has appeared. The species is much paler and has a more faded, washed-out appearance than any other of the yellow-winged forms.

***Helotrophia obtusa*, sp. nov.**

Dark smoky brown, almost blackish. Antennæ whitish above, distinctly reddish below. Head and thorax concolorous save that the tips of collar and thoracic tuftings are somewhat lighter brown. Abdomen uniformly smoky. Basal line obscurely marked, consisting of a very narrow black, preceded by an equally narrow pale shading. T. a. line geminate, well removed from base, outwardly oblique, even, the inner line narrow, black, the outer lost in the black median space. T. p. line geminate, even, obtusely curved over cell, then evenly oblique below, to the hind margin close to the point reached by the t. a. line. The median space is thus V-shaped and this is black or blackish-brown below the median vein; towards costa and in the cell where it is broken by the ordinary spots the shade lightens a little, but continues darker than the rest of the wing. S. t. line very narrow, rivulous, composed of whitish scales, more or less relieved by dusky preceding and following shades. Apex gray powdered. A series of black, interspacial terminal lunules. Fringes smoky brown, with a yellow line at base, and cut with yellow opposite the veins. A very short, broad claviform is outlined in black scales. Median vein marked with pale scales through the dark median space, and these scales are continued on veins 3 and 4 from the forking to the s. t. space. Orbicular small, oval, oblique, of the ground color, very narrowly outlined by pale scales. Reniform upright, inferiorly dilated and undefined, of the ground color, defined by a very narrow pale line except as above stated. Secondaries dark smoky, a narrow extra-median line and a discal lunule being faintly traceable. Beneath smoky, very powdery, with a large discal spot and sometimes an extra-median line on the secondaries. The primaries in one case have also a vague discal spot. Expands 1.12-1.32 inches = 28-33 mm.

Habitat.—Ashleys Ferry, Claremont, N. H., August 17, 1901, September 3, 1900, Mr. Foster.

Three males and one female, the former the smaller examples, none of which are really good.

The species is so utterly unlike any other known to me that I suspected a foreign origin when the first example came into my hands. It is perhaps questionable whether the species can remain in *Helotrophia*; but the peculiar type of maculation allies it to *Euplexia*, which it also resembles in wing-form, while in other respects the structural details point to *reniformis* which is resembled by the new form in the shape of the ordinary spots and the whitish markings of the median vein and its branches.

The specimens were communicated by Mr. F. H. Foster.

***Eucalyptera strigata*, sp. nov.**

Ground color creamy white or yellowish, varying a little in tint, and variably black or brown speckled. Head below the frontal tuft, the sides of the palpi and the anterior legs deep brown. Primaries with a broad somewhat diffuse blackish streak through the center of the wing, not quite reaching the base and usually fading out just short of the outer margin. Two small black points indicate the ordinary spots.

T. p. line indicated by a curved series of smoky venular points. A series of smoky, terminal, interspacial marks. The brown or blackish powdering on the primaries tends to darken the apical and terminal regions of the wing. Secondaries paler creamy, tending to dusky toward the apex. Beneath yellowish, primaries with a variable smoky suffusion; either a vague reproduction of the upper striga or involving the entire disc. Expands .90-1.30 inches = 23-32 mm.

Habitat.—Hackley, Texas, May 29; September 1-10.

Three males and six females from Mr. George Franck, who has others. The collector and the conditions under which they were collected are unknown to me. The species differs obviously from the other described forms by the continuous central streak and punctiform t. p. line. The males are smaller throughout and have the antennæ lengthily ciliated. The females vary more than the males, not only in size, but in relative distinctness of maculation. In the series before me the smallest female is as large as the largest male.

***Platysenta albipuncta*, sp. nov.**

Resembles *videns* in appearance, but is paler, not so reddish, not so glossy in appearance and is more contrastingly marked. General color a faintly-reddish gray, more or less powdered with black. Head irrorated with white scales. Collar more or less obviously tipped with white scales. Disc of thorax with a slight admixture of whitish scales, giving it a hoary appearance in good specimens. Primaries with a diffuse, blackish, powdery shade extending over the median vein, to or beyond the t. p. line and, in some specimens, expanding so as to take in the darker terminal space. In this dusky shading which is the dominant feature of the maculation, the orbicular is variably indicated. Sometimes it is scarcely traceable; sometimes a narrow circle of white scales; sometimes a concolorous disc of the ground color without powdering, and this may or may not have a smoky center. The reniform consists of a prominent white spot at the lower outer angle of the median cell, supplemented by scattered white scales superiorly. T. a. line is completely traceable in one example as a narrow, broken, outcurved, interrupted smoky line; but is more usually indicated by venular dots or is entirely wanting. T. p. line is a curved series of venular blackish dots, followed and sometimes preceded by white scales. This also varies in distinctness; but is always traceable and usually obvious. The veins here are also more or less speckled with white scales giving a somewhat hoary appearance. The veins are otherwise smoky, darker outwardly. A black terminal line, and from this a dusky shade may extend inwardly a variable distance. Fringes smoky or blackish, narrowly cut with white and with a white dot at the base on the veins. Secondaries, white in the male, or little yellowish soiled in the female, outer margin narrowly dusky, broader on costa. Beneath, primaries gray, powdery, with a more or less obvious smoky outer line. Secondaries powdery along costal margin only, and with a small discal dot which may be wanting. Expands 1.12-1.25 inches = 28-31 mm.

Habitat.—Harris Co., Texas (Franck); Colorado Springs, VIII, 5, Colorado (Osler).

Nine examples all males, and all save one from Texas. The specimen from Colorado Springs has been in collection for some time and was associated with *videns*. To the latter the new species is really very close and, without so many examples of both forms as are before me for comparison, I would hesitate about making the separation.

***Tæniocampa alurina*, sp. nov.**

Ground color of the usual dusty fawn brown, resembling *alia* at first sight and referable to the same group. Head and thorax concolorous. Antennæ of the male with short lateral processes, scarcely to be called pectinations yet more than the lateral projections present in *alia*: the processes bristled as usual.

Primaries sparsely powdered, less irrorate than *alia*, the median lines single and fairly marked. Basal line present, single, smoky, not prominent, very close to the root of the wing. T. a. line smoky brown, single, a little diffuse, only a very little outcurved. T. p. line single, smoky brown, quite well marked, a little outcurved over the reniform, a little incurved below. On close examination it is seen that this line is very finely crenulate, with small black dotlets on the veins; but the crenulations are filled in by the smoky shade so that it appears as a single, rather thick smoky line. S. t. line narrow, yellowish, irregular, fairly complete in two out of the three examples before me, preceded by a variable s. t. shade which may have a tinge of red. A series of smoky interspacial terminal spots which may be distinct or barely traceable. A diffuse median shade darkens the reniform and may or may not cross the wing. Orbicular round or nearly so, concolorous, obscurely defined by a very narrow slightly paler ring. Reniform moderate in size, only a little excavate outwardly, narrowly outlined in yellowish, darker than the ground. A somewhat reddish shade over the cell. Secondaries a paler reddish-gray, smoky outwardly, with a vague discal spot. Beneath reddish-gray, powdery; with a variably complete outer common line and a discal spot on each wing. Expands 1.30-1.45 inches = 33-36 mm.

Habitat.—Near Chicago, Illinois, April 27, 28, A. Kwiat.

Three male examples sent in by Mr. Kwiat and representing all his captures. Two of the examples are dated in 1900 and are very much alike; the third is dated in 1901 and resembles *alia* more closely than either of the others. Had I received this example first, I would probably have put it down as being a slight variation of the common form.

Compared with *alia* it is less powdery; it is somewhat smaller, the median lines obvious in all cases, which is contrary to what occurs in *alia*. Finally, the genital structure of the male is distinctive, resembling the European *incerta* more than the American representative. The harpes are broadly oval, the tip evenly rounded; clasper single, long, very stout, sharply drawn out at tip, strongly curved, without an accessory process at base. Compared with the figures given in my revision of *Tæniocampa*, the differences pointed out will appear obvious.

It is not improbable that examples of this species may be confused with *alia* in collections from the same faunal region.

Podagra, gen. nov.

Eyes naked, hemispherical, not prominent. Antennæ in both sexes simple. Head moderate in size, the front protuberant a trifle excavated centrally, with a small conical median process and yet smaller lateral projections. Palpi small, not exceeding the front; terminal joint small, obtuse. Vestiture scaly. Thorax with the patagiæ marked, a little uplifted. Legs moderate except the anterior, which have the femora and tibiæ enlarged or dilated. Posterior tibiæ with a few spinules between the usual spurs; median moderately spinulate throughout; anterior somewhat abbreviated, inflated and with the upper surface closely set with prominent, stout spines which are long, equal in diameter and bluntly terminated. Primaries trigonate, costa obviously depressed beyond the middle, apices well marked, outer margin evenly rounded, the fringes a little dentate opposite the veins.

The genus is unique in the armature of the fore tibiæ, and should be readily recognized.

Podagra crassipes, sp. nov.

Ground color of head, thorax and primaries a pale ashen gray with a clay yellow or reddish-yellow shading. Head and collar luteous or pinkish. Head in front and sides of palpi with black powderings. Thorax with black powderings which are massed on the patagiæ, on the posterior tuft and, to a less degree, on the disc. Abdomen evenly creamy yellowish. Primaries more or less black powdered, with the luteous or pinkish tinge dominant in the basal and terminal spaces and longitudinally through the center of the wing. Basal line wanting or barely indicated on the costa only. T. a. line broken, incompletely geminate with a long outward tooth in the submedian interspace; almost or quite meeting a similar, inward tooth from the t. p. line. T. p. line geminate, even, broken, well outcurved over the cell, incurved below, with a more or less well-marked inward tooth to meet that of the t. a. line in the submedian interspace. The outer portion of the line is most obvious and, next to this, is the pale included space; the inner line being chiefly defined by the slight color contrasts. Except through the cell the median space is blackish, powdered. S. t. space blackish, powdery except opposite the cell. S. t. line black, broken, emphasized on the veins which are sometimes black spotted, as a whole almost evenly oblique. Terminal space evenly tinged or with only the veins marked with black scales. A series of black, terminal, interspacial lunules, beyond which the whitish fringes are cut with black. Orbicular a small black dot which is sometimes wanting. Reniform wanting or very obscure, marked by two minute black dots or by a vague paler shading which has no definite outlines. Claviform wanting. Secondaries white in both sexes, with a smoky powdering over the veins outwardly and with an undefined, powdery discal lunule. Beneath white, more or less powdery: primaries tending to a pinkish shading, a smoky disk and a blackish costal shade at the s. t. line. All wings with a blackish discal lunule. Legs gray or blackish, ringed with whitish. Expands .95-1.06 inches = 24-27 mm.

Habitat.—Quartzsite, Yuma County, Arizona, in March; Walters Station, Colorado Desert, California, April 20 (George S. Hutson).

Three males and four females in good condition and very much alike. It is a typical desert species with the peculiar reddish suffusion over a gray base and a powdering of black scales over all. I know of nothing that resembles it closely in appearance and certainly nothing that has the same generic characters.

Crimona, gen. nov.

Eyes naked, hemispherical, of good size. Head well developed, not prominent; front protuberant, roughened, vestiture flattened hair and scales, projecting straight forward. Palpi not extending beyond the front. Tongue strong. Antennæ in the ♀ simple—male not at hand. Tibiæ not spinose; anterior short, broad, corneous, with a single, median, claw-like process; median normal; posterior leg aborted, not more than half developed. Vestiture flattened hair and scales; patagiæ marked, thorax quadrate, a well-marked posterior tuft. Abdomen with small dorsal tufts on the basal segments. Primaries trigonate, costal margin nearly straight, apices well-marked, outer margin very oblique, arcuate, with long fringes.

Resembles *Oncocnemis* somewhat in appearance, but differs in the abbreviated fore tibiæ and in the protuberant, rough front. The hind legs are abnormal in their development, and this feature may be accidental in this example; but otherwise the insect is perfect, and the degeneration is perfectly symmetrical. The genus seems not to conflict with any other known to me.

Crimona pallimedia, sp. nov.

Ground color a light mottled luteous, varied with ashen gray. Head and collar pale luteous, with an admixture of white and black scales; the latter more numerous at the base of the wings. Patagiæ gray, the disk rather well powdered with black scales. Thorax centrally luteous, the posterior tuft gray, black powdered. The small abdominal tufts gray, else that part is very pale yellowish. Primaries with basal space luteous, a little streaky, the yellowish shade narrowing toward the center of the wing, but cutting the median space and expanding into the s. t. space which is completely filled. Basal line wanting. Median lines interrupted. The median space forms a somewhat elongate, trigonate gray patch on the middle of the inner margin, and a much larger, triangular, gray area on the costa. These areas are limited by narrow black lines. Orbicular oval, whitish, with gray center, partly undefined. Reniform large, kidney-shaped, outlined by a narrow black line, pale, with a gray, powdery center. The terminal space is very narrow, gray, preceded by a pale diffuse s. t. line, which is inwardly bordered by a darker luteous shading. A black terminal line, more or less broken on the veins. The fringes mottled, ashen gray. Secondaries whitish at base, darkening to a smoky extra-median shade: beyond that is a whitish area which in turn darkens to a smoky border, sharply limited by a black line at the base of the white fringes. Beneath white, with a broad blackish extra-

median shade band, and discal spots on both wings. Primaries blackish powdered on costal area. Expands 1.12 inches = 28 mm.

Habitat.—Walters Station, California, in April (Geo. S. Hutson).

This is a desert species, represented by one female only. It has somewhat the wings form of *Fala ptycophora* and belongs to the same general series with that species. The insect is peculiar in the cutting of the median space, by which the basal and s. t. spaces are connected. I know of nothing resembling it nearly enough to cause confusion.

***Oxycnemis fusimacula*, sp. nov.**

Ground color bluish ashen gray, more or less black powdered. Antennæ black and white ringed. Head and thorax evenly black-speckled, the posterior scale tuft more blackish at tip. Primaries with the maculation neatly defined, but with a streaky appearance due to the fact that the veins are generally marked with white scales in the darker areas and with black scales in the paler areas. Basal space paler than the rest of the wing. Basal half line black, single, sometimes obscured. T. a. line single, slender, black, with a prominent outward angulation centrally, and an outward bend below the internal vein. T. p. line slender, black, its inception on the costa obscured by a white and black streaking, inwardly oblique, with a somewhat abrupt though slight incurve below the cell. S. t. line is a diffuse whitish shade from the apex to the anal angle, irregular and variably defined. An incurved blackish shading starts from the costa within the apex, crosses the t. p. line, outwardly marks the reniform and ends on the median vein : forming the most prominently contrasting feature of the wing. There is a black terminal line, and the long, gray fringes are narrowly cut with white opposite the veins. Claviform white-ringed, paler than ground, extending from the angle of the t. a. line nearly or quite across the median space, the pointed tip often touching the t. p. line. The ordinary spots are fused and margined by a narrow white line which, at the upper angle of the reniform breaks into a series of white rays extending to the costa inside of the curved blackish shade already described. Secondaries white at base, becoming smoky outwardly, more so in the female, the veins a little soiled. There is a smoky terminal line and the fringes are somewhat marked with smoky. Beneath, primaries blackish, the fringes prominently cut with black and white. Secondaries white, a little powdered over costal region. Expands .90–1.00 inch = 23–25 mm.

Habitat.—Quartzsite, Yuma Co., Arizona, in March ; Walters Station, California, in April (George S. Hutson).

One male and seven females in good condition ; all desert collections. The species is close to *advena* Grt.; but that species has the t. a. line upright and the ordinary spots subequal, with included dots. The prominent angle in the t. a. line of the new species and the long, fused, white-ringed ordinary spots, will form good distinctive characters. The dark subapical shade is the most obvious feature and quite characteristic. There is very little variation in the series

before me—being all a matter of a little more or a little less in some one or more unimportant features.

Acontia Ochs.

Since my Revision of the species of *Acontia* only a little over a year ago (Trans. Am. Ent. Soc., XXVII, pp. 47–84, September, 1900) I have received much material for determination and otherwise. This has served to complete sets and to confirm identifications made. It has also disclosed the existence of four heretofore undescribed species three of which are here characterized. Of these one, from Lake Worth, Florida, is due to the untiring work of Mrs. Slosson, who has discovered so many interesting species in her favorite localities. The others are from the Southwest. With one exception the examples described were taken by Mr. George S. Hutson on a prospecting trip across the desert from Yuma County, Arizona, to San Bernardino County, California. Exact localities are not available; but those marked Quartzsite, Yuma County, Arizona, were taken not far from that camp, while those marked Walters Station, California, were taken nearest to that place. In each case the territory was similar, except in elevation, and quite a number of the species from both localities proved identical. The character of Mr. Hutson's sendings indicates the existence of a series of species of which we have thus far only the merest fragments.

***Acontia niveicollis*, sp. nov.**

Head except extreme base, slaty gray. Collar white at base like the head, else like the thorax, which is a glistening smoky or slate gray, verging toward deep chocolate brown. Abdomen smoky brown above, white beneath. Primaries white, mottled with slate gray. The white area extends along the costal area and through the cell to the reniform, broken by a slaty costal spot at the place of the t. a. line. Below the median vein the wing is slaty gray or blackish to the t. p. line; broken by a white transverse line representing the pale included space of the t. a. line. Above the reniform is a small, quadrate slaty spot, from which the dark gray t. p. line curves over the cell and forms the apparent outer margin of the reniform. The orbicular is a small black dot. The reniform is a dark, slate gray, round spot of moderate size, surrounded by a well-defined white annulus and incompletely gray margined without that. There is a quadrate white spot on the costa beyond the t. p. line and from the dark shade which limits this outwardly, arises a slender broken line of gray scales, parallel to and forming the outer part of the t. p. line. S. t. and terminal spaces white except at apex, which is slate gray with a brown tinge. The apical dark area is crossed by the thread like, white s. t. line and emphasized by an oval black spot and some blue scales. Metallic blue scales are also found in the darker part of the

basal area. Some golden brown scales are at the extreme apex, extending on to the fringes at that point. A black terminal line, broken on the veins. Fringes white except at apex, opposite the cell and at anal angle, where they are slaty gray brown. Secondaries whitish at base, becoming smoky outwardly. Fringes white, with a smoky brown line at apex. Beneath, primaries smoky, with a yellowish tinge, costa whitish with the dark blotches of the upper side more faintly reproduced. Secondaries whitish with costal margin powdery, outer margin narrowly smoky, and a smoky discal lunule. Expands .80 inch = 20 mm.

Habitat.—Walters Station, California, in March (Geo. S. Hutson).

A single male, in good condition taken in the Colorado desert. These species resembles *lanceolata* and belongs with it; but it is much smaller, the head is brown, and the collar is white at the extreme base only. The maculation differs considerably in details, the new form being really in this respect somewhat intermediate between *lanceolata* and *gonella*. The front is normally convex only, vein 5 of the secondaries is practically obsolete, and veins 3 and 4 fork half way between the end of the cell and the outer margin.

***Acontia semiatra*, sp. nov.**

Head and thorax creamy white or yellowish with a slight reddish tinge, immaculate. Abdomen a trifle smoky, the margins of the segments narrowly white-ringed. Primaries, basal space, creamy yellow with a slight reddish tinge, and this is the underlying ground color. Basal line marked by a blackish spot on costa, and sometimes by another on the median vein. Median space a slaty, somewhat glistening black; almost solid in same specimens, usually a little mottled over the cell. The t. a. line is defined by the inner boundary of the median space, very even, with a slight outcurve centrally. The t. p. line is defined in the same way as the outer boundary of the median space, very evenly outcurved over the cell and somewhat irregularly incurved below:—the edge in the submedian interspace being somewhat jagged. Beyond this line is a shading of the yellowish ground, narrow and sometimes linear from the costa to the middle of the wing, but usually filling the subterminal space below that point. Terminal space blackish-gray, s. t. line very irregular, broken, whitish, sometimes barely traceable. A series of small white venular dots at base of fringes. The ordinary spots are much obscured or barely traceable. The orbicular may be guessed at as a more intensely black spot just without the inner margin of the median space on the cell. The reniform is usually obvious, though not defined; consisting, when best marked, of a larger inferior and smaller superior black spot, vaguely outlined by a yellowish shading. Secondaries smoky, paler at base, the fringes whitish. Beneath, a pale, smoky, iridescent yellowish, without obvious maculation; but on the primaries, with a faint reflection of the upper surface. Expands .80–.85 inch = 20–21 mm.

Habitat.—Quartzsite, Yuma Co., Arizona, in March (Geo. S. Hutson).

One male and three females, all in good condition and all very

much alike. The only variation is in the amount of mottling in the upper portion of median space and in the amount of yellow in the s. t. space.

The species is quite unlike any other of our described species and does not fit properly into any of the series in my Revision of this genus. It may perhaps be best associated with *arizonæ* on superficial appearance, until other allies are found.

The front is somewhat bulging and, on the hind wings, vein 5 is well removed from 4 as well as weaker than the others.

***Acontia tenuescens*, sp. nov.**

Head and thorax white, the head with a narrow, gray, transverse band across middle of front. Abdomen wanting, but probably white, concolorous. Primaries white from base to beyond the middle. On the costa the white is broken a little beyond the middle by an ochre yellow mark, which extends toward the reniform and is not prominent or sharply defined. Beyond this it extends almost to the apex. Orbicular wanting. Reniform of good size, round, black, mottled with blue scales, narrowly white-ringed. On the internal margin just outside the middle a moderate, fairly defined, slate gray or blackish band starts, curving upward so as involve half of the reniform and continuing on to or near to, the apex. The terminal space is variably darkened by slate-gray or blackish shadings, and there is a blackish or dark gray, broken terminal line. The fringes are white. Secondaries white, the apical region shaded with blackish; fringes white. Beneath, primaries black except the margins and fringes; secondaries white. Expands .88 inch = 22 mm.

Habitat.—Lake Worth, Florida.

Two female examples from Mrs. A. T. Slosson; both of them minus the abdomen; but otherwise perfect examples. The loss of the abdomen was in transportation and was not due to any error or omission of the collector.

This species belongs with *virginalis* Grt., and *binocula* Grt., differing from both in the well-defined narrow curved band which extends from the inner margin to the apex. In one example the apex is fully attained without break other than a fine white s. t. line: in the other the band is broken just beyond the reniform, traceable by yellow scales to the apex, where the costal margin is again dark gray. It is probable that all intermediate forms occur.

In this species the front bulges moderately, vein 5 of the secondaries is from the cross-vein, well removed from 4, and it is much weaker than the others.